

What is claimed is:

1. A method of establishing communications between a plurality of wireless devices including at least a first wireless device and a second wireless device, the method comprising the steps of:

(a) scanning, by the first wireless device, a given frequency band for receiving a radio signal, comprising the steps of:

(a1) measuring noise at a plurality of frequencies within the given frequency band;

(a2) measuring signals at a plurality of frequencies within the given frequency band to determine whether any of the frequencies within the given frequency band is used by an existing communication link;

(a3) determining available frequency channels within the given frequency band based upon the steps of measuring the noise and measuring the signals;

(b) computing a spectral signature for the available frequency channels within the given frequency band;

(c) establishing far-end communication parameters for the second wireless device; and

(d) transmitting the far-end communication parameters to the second wireless device.

1 2. The method of claim 1, further comprising the step
2 of setting a plurality of frequency bands for scanning by the
3 first wireless device.

1 3. The method of claim 1, further comprising the step
2 of initializing scan receiver parameters by the first wireless
3 device prior to the step of scanning the given frequency band.

1 4. The method of claim 3, wherein the step of
2 initializing scan receiver parameters comprises the step of
3 receiving at least one user configuration input.

1 5. The method of claim 4, wherein said at least one
2 user configuration input includes data speed and type of
3 service.

1 6. The method of claim 4, wherein the step of
2 establishing far-end communication parameters comprises the
3 step of comparing the spectral signature for the available
4 frequency channels with said at least one user configuration
5 input.

1 7. The method of claim 1, wherein the step of measuring
2 the noise comprises the steps of measuring a noise floor and
3 measuring an average noise level over the given frequency
4 band.

1 8. The method of claim 1, wherein the communication
2 parameters include a map of the available frequency channels
3 within the given frequency band.

1 9. The method of claim 8, wherein the communication
2 parameters further include quality parameters.

1 10. The method of claim 9, wherein the quality
2 parameters include a bit error rate (BER).

1 11. The method of claim 9, wherein the quality
2 parameters include a correlation time.

1 12. The method of claim 9, wherein the quality
2 parameters include block errors.

1 13. The method of claim 1, wherein the step of
2 transmitting the communication parameters to the second
3 wireless device comprises the step of transmitting a calling
4 signal carrying the communication parameters over a given
5 calling frequency.

1 14. The method of claim 13, wherein the step of
2 transmitting the calling signal over the given calling
3 frequency comprises the step of transmitting the calling
4 signal with a high processing gain, the calling signal
5 receivable by the second wireless device in a noisy
6 environment.

1 15. The method of claim 1 for continually maintaining
2 communications between the first wireless device and the
3 second wireless device, comprising the steps of repeating
4 steps (a)-(d) to transmit time-varying communication
5 parameters from the first wireless device to the second
6 wireless device.

1 16. The method of claim 1, further comprising the steps
2 of:

3 (e) receiving, by the second wireless device, the
4 communication parameters from the first wireless device;

5 (f) scanning, by the second wireless device, a
6 given frequency band for receiving a radio signal, comprising
7 the steps of:

8 (f1) measuring noise at a plurality of
9 frequencies within the given frequency band;

10 (f2) measuring signals at a plurality of
11 frequencies within the given frequency band to determine
12 whether any of the frequencies within the given frequency band
13 is used by an existing communication link;

14 (f3) determining a second plurality of
15 available frequency channels within the given frequency band
16 based upon the steps of measuring the noise and measuring the
17 signals;

18 (g) computing, by the second wireless device, a
19 second spectral signature for the second plurality of
20 available frequency channels within the given frequency band;

21 (h) establishing, by the second wireless device, a
22 second plurality of far-end communication parameters for the
23 first wireless device; and

24 (i) transmitting, by the second wireless device,
25 the second plurality of far-end communication parameters to
26 the first wireless device.

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17. The method of claim 16 for continually maintaining
communications between the first wireless device and the
second wireless device, comprising the steps of repeating
steps (e)-(i) to exchange time-varying communication
parameters between the first wireless device and the second
wireless device.

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18. The method of claim 17, wherein the communication
parameters are exchanged between the first wireless device and
the second wireless device as link level data.

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19. The method of claim 1 for establishing
communications between the first wireless device and a third
wireless device, further comprising the steps of:

4 (e) scanning, by the first wireless device, a given
5 frequency band for receiving a radio signal, comprising the
6 steps of:

7 (e1) measuring noise at a plurality of
8 frequencies within the given frequency band;

9 (e2) measuring signals at a plurality of
10 frequencies within the given frequency band to determine
11 whether any of the frequencies within the given frequency band
12 is used by an existing communication link;

13 (e3) determining available frequency channels
14 for the third wireless device within the given frequency band
15 based upon the steps of measuring the noise and measuring the
16 signals;

17 (f) computing a spectral signature for the
18 available frequency channels for the third wireless device
19 within the given frequency band;

20 (g) establishing far-end communication parameters
21 for the third wireless device; and

22 (h) transmitting the far-end communication
23 parameters to the third wireless device.

1 20. A method of establishing communications between a
2 plurality of wireless devices including at least a first
3 wireless device and a second wireless device, the method
4 comprising the steps of:

5 (a) scanning, by the first wireless device, a given
6 frequency band for receiving a radio signal, comprising the
7 steps of:

8 (a1) measuring noise at a plurality of
9 frequencies within the given frequency band;

10 (a2) measuring signals at a plurality of
11 frequencies within the given frequency band to determine
12 whether any of the frequencies within the given frequency band
13 is used by an existing communication link;

14 (a3) determining a first plurality of available
15 frequency channels within the given frequency band based upon
16 the steps of measuring the noise and measuring the signals;

17 (b) computing, by the first wireless device, a
18 first spectral signature for the first plurality of available
19 frequency channels within the given frequency band;

20 (c) establishing, by the first wireless device, a
21 first plurality of far-end communication parameters for the
22 second wireless device;

23 (d) transmitting, by the first wireless device, the
24 first plurality of far-end communication parameters to the
25 second wireless device;

26 (e) receiving, by the second wireless device, the
27 first plurality of far-end communication parameters from the
28 first wireless device;

29 (f) scanning, by the second wireless device, a
30 given frequency band for receiving a radio signal, comprising
31 the steps of:

32 (f1) measuring noise at a plurality of
33 frequencies within the given frequency band;

34 (f2) measuring signals at a plurality of
35 frequencies within the given frequency band to determine
36 whether any of the frequencies within the given frequency band
37 is used by an existing communication link;

38 (f3) determining a second plurality of
39 available frequency channels within the given frequency band
40 based upon the steps of measuring the noise and measuring the
41 signals;

42 (g) computing, by the second wireless device, a
43 second spectral signature for the second plurality of
44 available frequency channels within the given frequency band;

45 (h) establishing, by the second wireless device, a
46 second plurality of far-end communication parameters for the
47 first wireless device; and

48 (i) transmitting, by the second wireless device,
49 the second plurality of far-end communication parameters to
50 the first wireless device.

1 21. The method of claim 20, further comprising the step
2 of setting a plurality of frequency bands for scanning by the
3 first wireless device.

1 22. The method of claim 20, further comprising the step
2 of initializing scan receiver parameters by the first wireless
3 device prior to the step of scanning the given frequency band
4 by the first wireless device.

1 23. The method of claim 22, wherein the step of
2 initializing scan receiver parameters by the first wireless
3 device comprises the step of receiving at least one user
4 configuration input by the first wireless device.

1 24. The method of claim 23, wherein said at least one
2 user configuration input includes data speed and type of
3 service.

1 25. The method of claim 23, wherein the step of
2 establishing the first plurality of far-end communication
3 parameters by the first wireless device comprises the step of
4 comparing the first spectral signature for the first plurality
5 of available frequency channels with said at least one user
6 configuration input.

1 26. The method of claim 20, wherein the step of
2 measuring the noise by the first wireless device comprises the
3 steps of measuring a noise floor and measuring an average
4 noise level over the given frequency band by the first
5 wireless device, and wherein the step of measuring the noise
6 by the second wireless device comprises the steps of measuring
7 a noise floor and measuring an average noise level over the
8 given frequency band by the second wireless device.

1 27. The method of claim 20, wherein the communication
2 parameters for the first and second wireless devices include

3 first and second maps of the available frequency channels
4 within the given frequency band, respectively.

1 28. The method of claim 27, wherein the communication
2 parameters further include quality parameters.

1 29. The method of claim 28, wherein the quality
2 parameters include a bit error rate (BER).

3 30. The method of claim 28, wherein the quality
4 parameters include a correlation time.

5 31. The method of claim 28, wherein the quality
6 parameters include block errors.

7 32. The method of claim 20, wherein the step of
8 transmitting the first plurality of communication parameters
9 by the first wireless device to the second wireless device
10 comprises the step of transmitting a first calling signal
11 carrying the first plurality of communication parameters over
a first calling frequency, and wherein the step of
transmitting the second plurality of communication parameters
by the second wireless device to the first wireless device
comprises the step of transmitting a second calling signal
carrying the second plurality of communication parameters over
a second calling frequency.

1 33. The method of claim 20 for continually maintaining
2 communications between the first wireless device and the

3 second wireless device, comprising the steps of repeating
4 steps (a)-(i) to exchange time-varying communication
5 parameters between the first wireless device and the second
6 wireless device.

1 34. The method of claim 20, wherein the communication
2 parameters are exchanged between the first wireless device and
3 the second wireless device as link level data.

1 35. The method of claim 20 for establishing
2 communications between the first wireless device and a third
3 wireless device, further comprising the steps of:

4 (j) scanning, by the first wireless device, a given
5 frequency band for receiving a radio signal, comprising the
6 steps of:

7 (j1) measuring noise at a plurality of
8 frequencies within the given frequency band;

9 (j2) measuring signals at a plurality of
10 frequencies within the given frequency band to determine
11 whether any of the frequencies within the given frequency band
12 is used by an existing communication link;

13 (j3) determining available frequency channels
14 for the third wireless device within the given frequency band
15 based upon the steps of measuring the noise and measuring the
16 signals;

17 (k) computing, by the first wireless device, a
18 spectral signature for the available frequency channels for
19 the third wireless device within the given frequency band;

20 (l) establishing, by the first wireless device,
21 far-end communication parameters for the third wireless
22 device; and

23 (m) transmitting, by the first wireless device, the
24 far-end communication parameters to the third wireless device.

1 36. A method of establishing communications between a
2 plurality of wireless devices including at least a first
3 wireless device and a second wireless device, the method
4 comprising the steps of:

5 (a) setting a plurality of frequency bands for
6 scanning by the first wireless device;

7 (b) initializing scan receiver parameters by the
8 first wireless device;

9 (c) scanning, by the first wireless device, a given
10 frequency band for receiving a radio signal, comprising the
11 steps of:

12 (c1) measuring noise at a plurality of
13 frequencies within the given frequency band;

14 (c2) measuring signals at a plurality of
15 frequencies within the given frequency band to determine
16 whether any of the frequencies within the given frequency band
17 is used by an existing communication link;

18 (c3) determining a first plurality of available
19 frequency channels within the given frequency band based upon
20 the steps of measuring the noise and measuring the signals;

21 (d) computing, by the first wireless device, a
22 first spectral signature for the first plurality of available
23 frequency channels within the given frequency band;

24 (e) establishing, by the first wireless device, a
25 first plurality of far-end communication parameters for the
26 second wireless device;

27 (f) transmitting, by the first wireless device, the
28 first plurality of far-end communication parameters to the
29 second wireless device;

30 (g) receiving, by the second wireless device, the
31 first plurality of far-end communication parameters from the
32 first wireless device;

33 (h) scanning, by the second wireless device, a
34 given frequency band for receiving a radio signal, comprising
35 the steps of:

36 (h1) measuring noise at a plurality of
37 frequencies within the given frequency band;

38 (h2) measuring signals at a plurality of
39 frequencies within the given frequency band to determine
40 whether any of the frequencies within the given frequency band
41 is used by an existing communication link;

42 (h3) determining a second plurality of
43 available frequency channels within the given frequency band

44 based upon the steps of measuring the noise and measuring the
45 signals;

46 (i) computing, by the second wireless device, a
47 second spectral signature for the second plurality of
48 available frequency channels within the given frequency band;

49 (j) establishing, by the second wireless device, a
50 second plurality of far-end communication parameters for the
51 first wireless device;

52 (k) transmitting, by the second wireless device,
53 the second plurality of far-end communication parameters to
54 the first wireless device; and

55 (l) continually maintaining communications between
56 the first wireless device and the second wireless device,
57 comprising the steps of:

58 repeating steps (c)-(f) to transmit time-
59 varying communication parameters from the first wireless
60 device to the second wireless device; and

61 repeating steps (h)-(k) to transmit time-
62 varying communication parameters from the second wireless
63 device to the first wireless device.

1 37. The method of claim 36, wherein the step of
2 initializing scan receiver parameters by the first wireless
3 device comprises the step of receiving at least one user
4 configuration input by the first wireless device.

5 38. The method of claim 37, wherein said at least one
6 user configuration input includes data speed and type of
7 service.

1 39. The method of claim 37, wherein the step of
2 establishing the first plurality of far-end communication
3 parameters by the first wireless device comprises the step of
4 comparing the first spectral signature for the first plurality
5 of available frequency channels with said at least one user
6 configuration input.

1 40. The method of claim 36, wherein the step of
2 measuring the noise by the first wireless device comprises the
3 steps of measuring a noise floor and measuring an average
4 noise level over the given frequency band by the first
5 wireless device, and wherein the step of measuring the noise
6 by the second wireless device comprises the steps of measuring
7 a noise floor and measuring an average noise level over the
8 given frequency band by the second wireless device.

1 41. The method of claim 36, wherein the communication
2 parameters for the first and second wireless devices include
3 first and second maps of the available frequency channels
4 within the given frequency band, respectively.

1 42. The method of claim 41, wherein the communication
2 parameters further include quality parameters.

1 43. The method of claim 42, wherein the quality
2 parameters include a bit error rate (BER).

1 44. The method of claim 42, wherein the quality
2 parameters include a correlation time.

1 45. The method of claim 42, wherein the quality
2 parameters include block errors.

1 46. The method of claim 36, wherein the step of
2 transmitting the first plurality of communication parameters
by the first wireless device to the second wireless device
comprises the step of transmitting a first calling signal
carrying the first plurality of communication parameters over
a first calling frequency, and wherein the step of
transmitting the second plurality of communication parameters
by the second wireless device to the first wireless device
comprises the step of transmitting a second calling signal
carrying the second plurality of communication parameters over
a second calling frequency.

1 47. The method of claim 36, wherein the communication
2 parameters are exchanged between the first wireless device and
3 the second wireless device as link level data.

1 48. The method of claim 36 for establishing
2 communications between the first wireless device and a third
3 wireless device, further comprising the steps of:

4 (m) scanning, by the first wireless device, a given
5 frequency band for receiving a radio signal, comprising the
6 steps of:

7 (m1) measuring noise at a plurality of
8 frequencies within the given frequency band;

9 (m2) measuring signals at a plurality of
10 frequencies within the given frequency band to determine
11 whether any of the frequencies within the given frequency band
12 is used by an existing communication link;

13 (m3) determining available frequency channels
14 for the third wireless device within the given frequency band
15 based upon the steps of measuring the noise and measuring the
16 signals;

17 (n) computing, by the first wireless device, a
18 spectral signature for the available frequency channels for
19 the third wireless device within the given frequency band;

20 (o) establishing, by the first wireless device,
21 far-end communication parameters for the third wireless
22 device; and

23 (p) transmitting, by the first wireless device, the
24 far-end communication parameters to the third wireless device.